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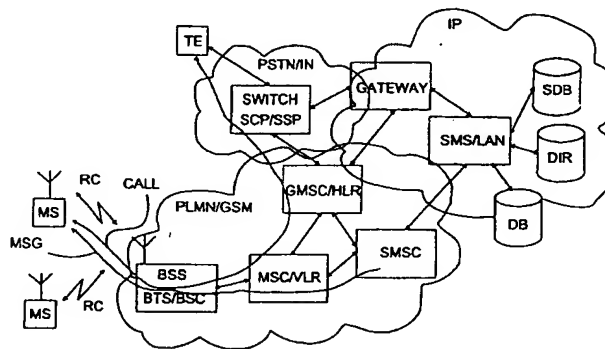
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(54) Title: TELECOMMUNICATION NETWORK AND METHOD FOR TRANSMISSION OF CALLER INFORMATION



(57) Abstract: The invention relates to a telecommunication network (PLMN, PSTN, IN) for transmission of information relating to the caller (TE, MS) to a wireless communication unit (MS), said telecommunication network comprising: means (SWITCH, SSP/SCP, GMSC/HLR, MSC/VLR, BSS, BTS/BSC) for transmission of a call (CALL) initiated by the caller to said unit. The telecommunication network also comprises: means (SMS/LAN, DIR, UDB, DB) for gaining access to information comprising stored, variable information relating to said caller; and means (SMSC, SMS/LAN) for delivering said information via a text format message (MSG) to said unit to identify the caller, wherein the different means of said telecommunication network are also arranged to time the delivery and transmission of said call in such a manner that said information is available in said unit a desired time in advance or with a desired delay in relation to the moment when said unit gives a signal indicating an incoming call (CALL). In an embodiment the telecommunication network also comprises means (SWITCH, SSP/SCP, GMSC/HLR, MSC/VLR, SMS/LAN) for retrieving said information after the means have detected the call initiated by said caller, the transmission of which call to said unit has begun. Said text format message is especially of such a type that it is immediately presented to the user of said unit without separate actions of the user.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## Telecommunication network and method for transmission of caller information

5 The present invention relates to a telecommunication network according to the preamble of claim 1 for transmission of caller-related information to a wireless communication unit. The present invention also relates to a method in a telecommunication network according to the preamble of claim 12 for transmission of caller-related information to a wireless communication unit.

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To allow mobility of persons, there are mobile systems of prior art available, in which wireless communication units operate. Such a device to be mentioned is a mobile phone complying for example with the digital GSM standard (Global system for mobile Communications, 15 GSM-1800, GSM-1900) specifications and operating in a mobile communications network based on a cellular network (PLMN, public land mobile network). Known devices include Nokia® 6110, Ericsson® R380s and Siemens® S35i mobile phones, the properties of which in addition to normal mobile station functions include for example reception of text messages, writing of the same and transmission to another 20 mobile phone.

The most recent mobile phone models also include the possibility to receive so-called Flash SMS text messages (in other words Alert 25 SMS), wherein the message in question is a Class 0 SMS, and it is shown immediately after reception on the display of the mobile phone, and can thus be rapidly read by the user. The flash text message must be stored separately. Typically, when a text message arrives, some kind of a notice or symbol appears on the display, or a sound signal is 30 given, whereafter the user must press one (Read) or several keys to read the message that has been stored in the memory of the SIM card.

When an arriving call is received in a mobile phone, it is also known that the number of the caller appears on the display. The PLMN network transmits this number to the device of the receiver of the call so 35 that the caller could be identified. If a corresponding telephone number with its name data is stored for example in the SIM card (Subscriber

identity module) of the mobile phone, most mobile stations are capable of automatically showing said name data instead of the number. Thus, it is easy to identify the caller and it is possible to make a quick decision whether to answer the call or not.

5

In PLMN networks there are also services available by means of which it is possible to receive news or topical information as a reply by means of short message service (SMS) messages, in other words text messages. One such service is Sonera<sup>®</sup> Find, in which it is possible to transmit a text message containing a telephone number to the telephone number of the service, whereby a text message is received as a reply, indicating the name of the person holding the number and his/her address. It is also possible to send a name of a person or a company as a text message, whereby the telephone number is received as a reply.

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If the name data related to the telephone number of the caller has not been stored in the SIM card, it is not possible to identify the identity of the caller when the mobile phone rings. It is especially important to be able to identify the identity of the caller when a decision has to be made whether to answer the call in a certain situation, for example to save time, or if a call is expected from a certain person or if some rapid actions are to be taken before the call is answered, wherein material or information relating to the caller or the call in question is obtained ready at hand. On the basis of the caller it is also possible to give the mobile phone to another person when it is known or presumed that the caller is trying to reach him/her.

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It is a purpose of the present invention to achieve an improvement in the prior art to solve the above-presented problem. Thus, caller information, especially name data can be presented on the display of a wireless communication unit, especially on the display of a mobile phone or a corresponding device. The caller is identified irrespective of the fact whether the number in question has been stored earlier in the memory of the unit or not. The information is presented for the user substantially at the same time when the phone rings, or a desired amount of time in advance before the phone even rings. In an em-

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bodiment it is possible to request for information during the call as well, or with a desired delay after the phone has rung.

5 The telecommunication network according to the invention is presented in claim 1. The method according to the invention is presented in claim 12.

10 The invention is based on the identification of the caller in a telecommunication network that can be a PLMN network, a PSTN network (Public switched telephone network) or a combination of these, wherein information relating to the caller, especially name and address data has been stored in a database in the network, and said information is transmitted to the target of the call. The function is a service the user can order from a network operator separately, wherein the call addressed to the user is identified, the desired information on the caller is  
15 searched for and the information is transmitted to the mobile phone of the user. The information is searched and transmitted, if the service profile of the user includes said service. The transmission is set by the data transmission network to occur either before the mobile phone rings, or during the same, before the call is answered and the connection between the caller and the receiver of the call is set up.  
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In the invention, especially a Flash SMS text message is used for transmission of the caller information. The caller can use a telephone  
25 of a conventional public switched telephone network or a wireless portable communication unit, for example a mobile phone. It is necessary that the caller or the telephone equipment can be recognized in a reliable manner, wherein the individual telephone number relating to the telephone is typically utilized, which number is even at present identified by the telecommunication network in manners known as such. The  
30 number to which the call is made is a so-called MSISDN number (Mobile subscriber international ISDN number) of the PLMN network that is used for routing of the call. To identify for example the mobile subscriber, an individual IMSI code (International mobile subscriber number) is used, and the mobile phone reports this number to the network  
35 in connection with the log-in. The database of the PLMN network maintains information on the MSISDN and IMSI codes that correspond

to each other, and thus it is possible to transmit the call to the correct mobile phone and the calling MSISDN number can also be recognized by means of this register. In the PSTN network the calling line can be identified in a switchboard, and thus the telephone number relating thereto can also be detected. Information on the telephone number can be transmitted in the network by means of signalling and in manners known as such for example by means of a protocol used in the data transmission. Thus, a service and devices are known in the PSTN network in which the telephone number of the caller is shown when the phone rings (so-called CLI, Caller ID, CLID, Caller identification).

It is also possible to use other identifications, for example key codes transmitted in the network, identifier numbers, DTFM signalling (Dual tone multi frequency), but the use of these often requires active measures to be taken by the caller. It is an advantage of the invention that it is invisible for the caller and that it does not require additional actions of the caller when the call is made. In the description hereinbelow the invention is referred to as a SMS/ID service.

By means of the invention considerable advantages are attained, wherein the amount of information the user of the service has on the callers is considerably increased, and thus it is easier to make decisions relating to different situations as to whether to answer the call or not. By means of the invention it is possible to sort and screen the calls more effectively. The information provided by the invention also enables more versatile properties and uses of the communication unit, wherein the caller information is utilized. One example is for example the conversion of the caller information in the unit into synthesized speech, wherein the display is not necessary or persons with impaired eyesight can use the mobile phone more effectively. The act of converting text into synthesized speech is known as such and can be applied in this new example. There are also known voice controlled phones that can be given a command to make a call to a desired number, wherein the aforementioned function would be a valuable addition to increase ease of use.

For the sake of safety it is often useful not to answer the phone while driving a vehicle, wherein by means of the invention it is possible to select only the most important calls. The function and the synthetic speech is especially advantageous in connection with HF devices (Hands free) when they are used in vehicles, because now it is not necessary to take a look at the display of the mobile phone. The speech is conveyed from the mobile station to the earpiece of the HF device or to another loudspeaker.

10 In the following, the invention will be described in more detail by using advantageous embodiments of the invention as examples. In the description, reference is at the same time made to the appended drawing, in which a telecommunication network according to a preferred embodiment of the invention is shown. In the drawing the example is illustrated with a block diagram. More precise structure and function of individual blocks is either known as such or they can be arranged for the function according to the invention, on the basis of this description. More detailed implementation will be obvious for anyone skilled in the art on the basis of the following description, and it can vary, wherein a more detailed description will not be necessary.

In the following, the aim is to discuss means intended for transmission of a call CALL initiated by a caller, in this case a line telephone TE, to a unit MS that is at least capable of receiving text format messages. Alternatively, the caller can be a mobile station MS. According to the drawing, a public land mobile network PLMN based on a cellular network, such as the GSM system or the PLMN system based on the same comprises, in a known way, a stationary base station subsystem (BSS). The base station subsystem normally consists of several base transceiver stations BTS distributed over a geographical area, each base station serving a cell which consists of at least a part of this geographical area. The data transmission between the mobile station MS located in the area of the cell served by the base transceiver station BTS and the base transceiver station, for example transmission and reception of speech or data, takes place by means of radio communication RC by utilizing radio channels allocated for the cell. The function of the base transceiver station is controlled by means of a base station

- controller (BSC) of the base station subsystem BSS. The base station controller BSC is connected to a mobile services switching centre MSC, the function of which is to transmit the connections between the base stations, to other mobile services switching centres, to the public switched telephone network PSTN, typically via a gateway GMSC (Gateway mobile services switching centre) and further to the data transmission devices of the PSTN network, for example to a line telephone TE.
- 10 The drawing shows only one BSS system and MSC centre, but it is well known that the system typically comprises a large number of the same. Similarly, the PSTN network comprises several data transmission devices and terminal equipment TE coupled thereto via different switchboards. The MSC system maintains for example information
- 15 on the location of the mobile station in the area of different cells by means of a home location register HLR and a visitor location register VLR. These registers HLR and VLR comprise for example the MSISDN and IMSI identifiers of the subscriber. The mobile services switching centres exchange this information for routing of the data transmission.
- 20 For the transmission and reception of text format messages, especially SMS messages, a short message service centre is connected to the MSC centre. This constitutes at least part of the means that are arranged for transmission of caller data in text format. SMSC stores the text messages temporarily until the mobile phone MS can be reached.
- 25 In the PSTN network the TE devices are connected to a switching centre SWITCH, which, in turn, is connected to other switching centres and also to the GMSC centre for routing of the calls. The TE device has an individual telephone number that is identified by the switching centre to be capable of switching the call.
- 30
- In order to maintain modern telephone services and create new services easily, the PSTN network is provided with IN architecture (Intelligent network) in which it is possible to centralize the services and implement independence of services, switchboards and equipment. The control is implemented from the switchboard to a separate SCP network element (Service control point). The functions of the switchboard
- 35 are located in the SSP network element (Service switching point) that



is connected to the SCP element to report events related to the call and to obtain instructions. Thus, it is possible to add new services in the SCP element and in the systems connected thereto. It is also possible to implement the functionality of the SSP element and the connections to the SCP element in the MSC centre of the PLMN network. Data transmission between different elements takes place by means of protocols, of which it is possible to mention for example H.323, INAP (Intelligent network application part), DSS1 (Digital signalling system 1) and SS7 (Signalling system 7) as well as SIP (Session initiation protocol) and MGCP (Media gateway control protocol). The SCP element is connected an apparatus via a signalling gateway GATEWAY, for example to a transmission server (Proxy), a MGC element (Media gateway controller) or an H.323 element (H.323 Gatekeeper), said apparatus taking care of the services, the necessary databases and connections to other network elements. The system in question can be for example a system which in this context is called a SMS/LAN system (Service management system), consisting of computers, servers and databases connected to each other via LAN network (Local area network). They form at least part of the means that are utilized to gain access to the desired, variable information. The databases can be services from which the desired information can be obtained by means of inquiries.

In one or more network elements (NE) of the telecommunication network, a large amount of information relating to the clients, such as registrations, is stored in a directory DIR and/or subscriber database SDB for example in the SMS/ID system. This information relates especially to the services the clients, i.e. telephone subscribers are authorized to use, to user identifications, address information or other operative information and service-specific information, to which general reference is made by UA (User account) user information. The SDB database is also supplemented with information indicating whether the user MS is possibly a SMS/ID service subscriber. The database is a relation database or X.500, a database utilizing LDAP protocol (Lightweight directory access protocol).

Alternatively, the SMS/ID service can be automatically available for all users, and thus verifications are not necessary. Depending on the implementation, the SMS/ID service can also in this situation be integrated to another network element capable of identifying (intercept) the signalling relating to the call set-up and giving information thereon to the other network elements of the network, so that the SMS/ID service could be initialized and timed. The message in question is especially a message of the used transfer protocol for connection set-up (call set-up message). In addition, the architecture of the PSTN and PLMN network can vary from one system to another, and thus the implementation can vary, but in a manner that is obvious as such for anyone skilled in the art in the light of this description.

The SMS/ID service or SMS/LAN service can inquire the information to be transmitted to the subscriber, in other words to the mobile phone of the person receiving the call also from one or several other databases or separate services, wherein for example the signalling of IP network (Internet protocol) is utilized. One known database is for example the Sonera® Finder service in whose database information of line telephone and mobile phone numbers of companies and private persons has been stored. By means of the service it is also possible to retrieve more precise information for example on the field of activity and function of the company. The service can be used via Datanet and Internet connection.

As an example, call set-up from the line telephone TE is examined. The call can also be set up from another portable communication unit MS, that is especially a mobile phone, wherein BTS and MSC operate in the call transmission. Depending on the situation, the switchboard SWITCH or the MSC centre connects the call to the SSP part of the IN network that functions together with the SCP part and connects the call to the GATEWAY. It is not necessary to use the IN architecture if MSC can connect the call directly to the GATEWAY. The switchboard SWITCH, the SSP/SCP element and the MSC centre, typically also the GMSC centre, constitute the means for retrieving said information by means of the SMS/LAN system when they have detected a call CALL the transmission of which has been started and is underway. Thus, the

caller TE directly selects the MSISDN number of the unit MS. When the IN network is used, the caller TE can use a so-called corporate number service (CNS), wherein the call can be connected to a desired unit, for example to the unit MS whose MSISDN number deviates from the number selected by the caller TE. The SMS/LAN system conducts an inquiry for example in the SDB database that contains information on the routing of the call when the CNS service is used.

Thereafter the SMS/LAN system conducts an inquiry for example in the address database or in a database containing the information necessary for the SMS/ID service, and transmits the information further to the unit MS. The necessary replies to the inquiries are received by the SMS/LAN system either from one or several directories DIR and databases DB. The SMS/LAN system connects the call back to the PSTN network. The call is connected further to the PLMN network and to the telephone MS that starts ringing, for example gives a sound signal. Substantially at the same time the SMS/LAN system requests the SMSC centre to send a Flash-type SMS message (Class 0 SMS) MSG to this telephone (on the basis of the MSISDN number). The SMS message is shown substantially at the same time on the display of the telephone with the desired delay or a desired time in advance. It is also possible to provide the PLMN system with the necessary functionality for example in the MSC/VLR and/or GMSC/HLR blocks by means of which the desired timing relating to the signal and initiation of the call as well as to the SMS message is attained. Thus, the signal follows the SMS message with a desired delay or they follow each other substantially without a delay, wherein the user of the telephone will detect them substantially at the same time. The delay of the signal should not, however, be so long that it causes an unpleasant delay for the caller. The delivery of the information can also occur after the signal, for example when the signal cannot be delayed any longer.

In an embodiment of the invention it is also possible to utilize such mobile phones in which the possibility to receive a Flash SMS message is missing, but which contain the reception of normal SMS messages (Class 1, 2, 3 SMS). Thus, a normal SMS message MSG is transmitted to the unit MS, said message containing the information of the SMS/ID

service, but the signal of the call is delayed as long as possible, so that the receiver would have the opportunity to read the message. This, however, requires a larger number of actions from the user, which is not desirable in many situations, for example in meetings and when driving a vehicle.

According to an embodiment the information of the SMS/ID service is available as a Flash SMS message MSG during the call as well, wherein DTMF codes are utilized that are produced by pressing the keys of the phone MS. In this embodiment the signalling of the phone is controlled via the SMS/LAN system when the call is active and the DTMF codes are converted into signalling events. The service is activated with a set DTMF code. Preferably, the DTMF signals are filtered off the call, so that the caller does not hear the DTMF sounds.

In relation to the SMS/ID service, it is also possible to supplement the database with information on the numbers for which the service is not to be used, because the corresponding address and name data can also be known by the subscriber or in the memory of the mobile phone in the above-described manner. In this way it is possible to restrict the costs, if the costs of the SMS/ID service are based on the amount of information transmitted at a time. It is possible to give the necessary set-up information preferably by means of the MS phone, for example by means of conventional text messages.

In addition to the above-described embodiments, the invention can also be applied within the scope of the appended claims.

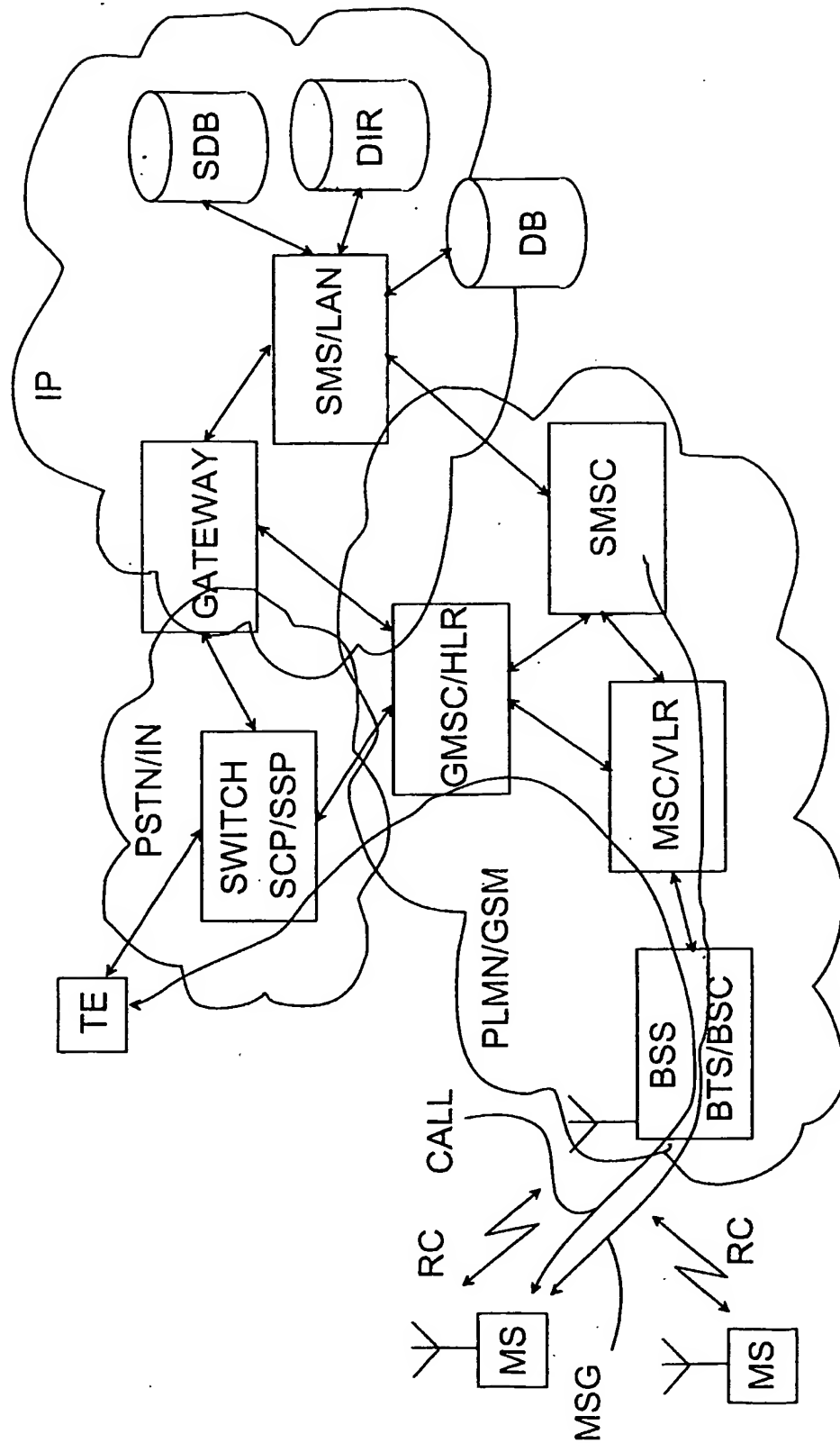
## Claims:

1. A telecommunication network (PLMN, PSTN, IN) for transmission of caller-related information to a wireless communication unit (MS), said  
5 telecommunication network comprising: means (SWITCH, SSP/SCP, GMSC/HLR, MSC/VLR, BSS, BTS/BSC) to transmit a call (CALL) initiated by the caller to said unit, **characterized** in that said telecommunication network also comprises: means (SMS/LAN, DIR, UDB, DB) for  
10 gaining access to information comprising stored, variable information relating to said caller; and means (SMSC, SMS/LAN) for delivering said information via a text format message (MSG) to said unit to identify the caller, wherein the different means of said telecommunication network are also arranged to time the delivery and transmission of said call in  
15 such a manner that said information is available in said unit a desired time in advance or with a desired delay in relation to the moment when said unit gives an signal indicating an incoming call (CALL).
2. The telecommunication network according to claim 1, **characterized** in that it also comprises means (SWITCH, SSP/SCP, GMSC/HLR,  
20 MSC/VLR, SMS/LAN) for retrieving said information after the means have detected the call initiated by said caller, the transmission of which call to said unit has begun.
3. The telecommunication network according to claim 1 or 2, **characterized** in that said text format message is of such a type that it is immediately presented to the user of said unit without separate actions of  
25 the user.
4. The telecommunication network according to claim 1 or 2, **characterized** in that said text format message is of such a type that it is first  
30 stored in the memory means of said unit and it can be retrieved by the user at a later stage to present it to the user of said unit.
5. The telecommunication network according to claim 1, **characterized**  
35 in that said wireless communication unit is a mobile phone operating in a digital cellular network, and it is also arranged to receive messages transmitted by the short message service.

6. The telecommunication network according to claim 5, **characterized** in that the unit also comprises means for converting the message into synthesized speech.
- 5 7. The telecommunication network according to claim 1, **characterized** in that said timing is arranged in such a manner that said information is available substantially at the same time with said signal.
- 10 8. The telecommunication network according to any of the claims 1, 3 or 5, **characterized** in that said message is a short message service message of Flash SMS type or Alert SMS type or Class 0 SMS type.
- 15 9. The telecommunication network according to claim 1, **characterized** in that said different means also comprise at least a base transceiver system (BSS, BTS/BSC), a mobile services switching centre (MSC/VLR, GMSC, HLR), a short message service centre (SMSC) and database means (SMS/LAN, UDB, DB) communicating with each other for storing, maintaining and retrieving said information when the wire-
- 20 less communication unit used by the caller is a device operating a public land mobile network (PLMN).
10. The telecommunication network according to claim 9, **character-**
- 25 **ized** in that said different means comprise a switching system (SWITCH, SSP/SCP), when the terminal used by the caller is a telephone device operating in a public switched telephone network (PSTN).
11. The telecommunication network according to claim 1, **character-**
- 30 **ized** in that it also comprises means for receiving requests made by means of said unit, said requests being made during the call, and said requests relating to said information, wherein the different means of said telecommunication network are also arranged to deliver said mes-
- 35 **sage** to said unit with a desired delay after said call has been answered.

12. A method in a telecommunication network (PLMN, PSTN, IN) for transmission of caller-related information to a wireless communication unit (MS), in which method a call (CALL) initiated by a caller is transmitted to said unit, **characterized** in the method information comprising  
5 stored, variable information relating to said caller is retrieved; and said information is delivered by means of a text format message (MSG) to said unit to identify the caller; and the delivery and transmission of said call is timed in such a manner that said information is available in said unit a desired time in advance or with a desired delay in relation to the  
10 moment when said unit gives a signal indicating an incoming call (CALL).
13. The method according to claim 12, **characterized** in that in the method: a call initiated by said caller is detected, the transmission of  
15 which call to said unit has begun; and the retrieval of said information is started as a result of the detection.
14. The method according to claim 12 or 13, **characterized** in that said message is presented immediately to the user of said unit without  
20 separate actions of the user.
15. The method according to any of the claims 12 to 14, **characterized** in that said timing is arranged in such a manner that said information is available substantially at the same time with said signal.  
25
16. The method according to claim 12, **characterized** in that a request made by means of said unit is received in the telecommunication network, said request being made during the call, and said request relating to said information, and said message is delivered to said unit  
30 with a desired delay after said call has been answered.
17. The method according to claim 12 to 16, **characterized** in that the text format message is converted in the unit into synthesized speech and it is presented to the user.

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 02/00368

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04M 1/57, H04Q 7/22

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9957917 A1 (NOKIA NETWORKS OY ET AL), 11 November 1999 (11.11.99), page 2, line 24 - page 6, line 6, figures 1-2, abstract --	1-17
X	WO 9949681 A1 (QUALCOMM INCORPORATED), 30 Sept 1999 (30.09.99), page 4, line 17 - line 28, figures 3-4, claims 12-14, abstract --	1-17
X	US 5883943 A (SIDDIQUI), 16 March 1999 (16.03.99), column 4, line 43 - column 5, line 2, figures 1-5D, abstract --	1-17

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

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## INTERNATIONAL SEARCH REPORT

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2776451 A1 (BOUYGUES TELECOM SOC ANONYME), 24 Sept 1999 (24.09.99), page 1, line 3 - page 7, line 29, figures 1-3, abstract  -----	1-17

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

02/09/02

International application No.

PCT/FI 02/00368

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